an introduction to the semantic ontology

Semantics 3, UCLA Linguistics

Spring 2022

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1 formalizing the ontology

- Church (1932): the lambda calculus, for modeling functions and their arguments
  - the lambda calculus is Turing complete, which means it's a universal model of computation with certain properties
  - two flavors (roughly): typed and untyped
  - there is a trade-off between them in terms of power and empirical coverage: an untyped lambda calculus is more powerful (has fewer expressive restrictions)
- Montague (1970, 1973): a compositional, syntactically informed formal semantics of natural language, with a focus on quantifier scope

2 justifying the ontology

- what is the lowest number of types we need for a compositional, Fregean semantic formalism?
  - Gallin (1975) typologizes typed lambda calculus: a formalism is 'Ty-n' for any amount of types n other than the foundational basic type
  - the following distinctions are discussed in detail in Rett (2022)
    - **Type Reductionalism**: Henkin (1963); Partee (2009); Keenan (2015, 2018): Ty-0, achieved with a heavy reliance on set theory, and a reimagining of the foundational basic type
    - **Type Ersatzism**: Ty-1, simply-typed (Church, 1932; Carlson, 1977; Klein, 1980)
    - **Type Proliferationalism**: lots of types! up to Ty-5 (Champollion, 2010), Ty-7 (Bittner, 2003, 2006), and Ty-9 (Landman, 2006)
- what's the difference between a simple type and a complex type?
  - (a.k.a. why semanticists get so upset about $\langle e \rangle$)
  - how do I know a simple type when I see one?

3 different ways to be a possible world: a case study in typehood

- let's talk about possible worlds... what's the evidence that we need or want them?
- does that mean possible worlds are necessarily a basic entity or type?
- three options, historically

1. we want intensionality, and we don't care about having the extra type, but we don't want the extra semantic object[1]
   - $^{\vee}P$ refers in a possible world w to the set of entities that are P in w (type $\langle e, t\rangle$)
   - $^{\wedge}P$ refers in w to the set of entities that are P in all possible worlds (type $\langle s, \langle e, t\rangle\rangle$)
   - so $[\![$the unicorn$]\!] = \lambda P \exists x \forall y[\text{unicorn}(y) \leftrightarrow x = y \wedge {}^{\vee}P(x)]$
   - but $[\![$Jessica seeks a unicorn$]\!] = \text{seek}(\text{j}, {}^{\wedge}\lambda P \exists x[\text{unicorn}(x) \wedge {}^{\vee}P(x)])$
2. as a restriction on the interpretation function (Heim & Kratzer), e.g. $\lambda w.[\![\alpha]\!]^{w,g}$
   - what else have you seen indexed on the interpretation function? (what's g?)
   - why might we put something there, given your impressions of the convention?
3. as a semantic argument, e.g. $\lambda w.[\![\alpha(w)]\!]^{g}$

- our semantic theory needs a metasemantics that explains what constitutes a possible type

(1) **Semantic Types** *Option 1*

a. e and t are types
b. If σ is a semantic type, then $\langle s, \sigma\rangle$ is a semantic type
c. If σ and τ are semantic types, then $\langle \sigma, \tau\rangle$ is a semantic type
d. Nothing else is a semantic type

(2) **Semantic Types** *Options 2 & 3*

a. e and s and t are types
b. If σ and τ are semantic types, then $\langle \sigma, \tau\rangle$ is a semantic type
c. Nothing else is a semantic type

4 some empirical criteria for determining what is a basic type

- anaphoric parallels: individual and tense data from Partee (1973, 1984); modal data from Stone (1997)
  - referential readings

(3) a. (*sitting at the bar*) She left me. *individual*
b. (*leaving for a road trip*) I didn't turn off the stove. *tense*
c. (*shopping for big speakers*) My neighbors might/would kill me. *modal*

  - definite anaphora

(4) a. Sam is married. He has three children. *individual*
b. When John saw Mary, he crossed the street. *tense*
c. His company would face bankruptcy if the merger succeeds. Bankruptcy would not be an immediate effect. *modal*

  - indefinite anaphora

(5) a. Pedro owns a donkey. He beats it. *individual*
b. Mary woke up some time during the night. She turned on the light. *tense*
c. There may be other retirements come April 18, but they will be leaving by choice. *modal*

  - bound variable

(6) a. Every woman believes she is happy. *individual*
b. Whenever Mary telephoned, Sam was asleep. *tense*

[1] Remind me to talk to you about $\bigvee$ too...

c. If a concertgoer arrives late, he or she will not be permitted into the auditorium until intermission. *modal*

- donkey anaphora

(7) a. If Pedro owns a donkey, he beats it. *individual*
b. Whenever Mary telephoned on a Friday, Sam was asleep. *tense*
c. If a submarine cannot self-destruct and if an enemy captures it, the enemy will learn its secrets. *modal*

- lexicalized quantifiers (Schlenker, 2006)
  - a question for this and the anaphora test: what to make of cross-linguistic syncretism between domains (e.g. *how* ranging over manners and degrees, Anderson and Morzycki 2015)?
- empirical adequacy: a given phenomenon can only be modeled using a different type (or subtype)
  - degrees (Kennedy 1999, cf. Klein (1980))
  - situations (Kratzer, 1989)
- what about parallels between different types (e.g. the difference between lattice-structured and linearly-ordered domains, Rett 2015)?

5 what's out there?

entity	**type**	**conventional variables**	**origin(s)**
individuals	e	x, y	Montague (1970, 1973)
possible worlds	s	w	Kripke (1959)
events	v	e	Davidson (1967)
times	i	t	Partee (1973, 1984)
degrees	d	d	Cresswell (1976)
kinds	k	k	Carlson (1977)
situations	s	s	Barwise (1981); Kratzer (1989)
vectors	v	u, v	Zwarts (1997)

- we're going to be talking about the most prominent of these this quarter: events, situations, and degrees
- but in looking at these, we'll look at the arguments for them, and some arguments for cross-domain polysemy
- and we'll also look at a few nearby, less prominent putative types, like vectors, kinds, and manners
- hopefully you'll leave this class being able to read work on any of these topics...
- ...and also be a responsible consumer of arguments for or against the need for these types...
- ...and, in so being, better understand the nature of our metasemantic desiderata writ large

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